

WHAT IS CLAIMED IS:

1. A surgical instrument comprising:

an insertion section having a distal end portion
and a proximal end portion, the insertion section
5 comprising first and second driving rods which are
disposed side by side and each of which has a distal
end portion and a proximal end portion;

a pair of jaws disposed in the distal end portion
of the insertion section;

10 a support which pivotally supports at least one of
the pair of jaws to be relatively opened/closed;

a sliding member which supports at least one of
the pair of jaws being pivotally supported by the
support, and which is slid in an axial direction of the
15 support with respect to the support to relatively
open/close at least one of the pair of jaws being
pivotally supported by the support;

a connecting rod having a distal end portion and a
proximal end portion, the sliding member being
20 pivotally supported on the distal end portion of the
connecting rod to open/close the pair of jaws, and the
distal end portion of the first driving rod being
pivotally supported on the proximal end portion of the
connecting rod;

25 a rotation mechanism which rotatably supports the
support on the distal end portion of the insertion
section, and pivotally supports the support on the

distal end portion of the second driving rod in a state of being offset with respect to a center axis of the support; and

an operation section disposed in the proximal end portion of the insertion section, which pivotally supports the proximal end portions of the first and second driving rods, when the operation section is opened/closed and rotated, an opening/closing force by the opening/closing operation being transmitted from the proximal end portion to the distal end portion of the first driving rod to slide the sliding member on the support through the connecting rod thereby opening/closing the pair of jaws, and a rotating force by the rotation operation being transmitted from the proximal end portion to the distal end portion of the second driving rod to apply a rotational force on the support to rotate the support on the distal end portion of the insertion section, thereby rotating the pair of jaws with respect to the insertion section relatively.

2. The surgical instrument according to claim 1, wherein the connecting rod has rigidity which opens/closes the pair of jaws for a biomedical tissue in a state where a rotational position of the pair of jaws with respect to the insertion section has been held to enable treatment of the biomedical tissue.

3. The surgical instrument according to claim 2, wherein the connecting rod is made of a metal

material.

4. The surgical instrument according to claim 3,
wherein the metal material is stainless.

5 5. The surgical instrument according to claim 3,
wherein the first driving rod is arranged in a
position of being offset with respect to a center axis
of the insertion section,

the sliding member is arranged on a center axis of
the support, and

10 when the insertion section and the support are
arranged on the same axis, an axial direction of the
connecting rod is inclined in an axial direction of the
insertion section and the support.

15 6. The surgical instrument according to claim 5,
wherein the sliding member has a circular-arc
surface, and

a distal end portion of the connecting rod has an
abutment surface which is abutted on the circular-arc
surface of the sliding member.

20 7. The surgical instrument according to claim 6,
wherein the abutment surface of the connecting rod
has inclination in the axial direction of the
connecting rod.

25 8. The surgical instrument according to claim 7,
wherein the pair of jaws have treatment section
opening/closing mechanisms which are opened oppositely
to each other in the axial direction of the support.

9. The surgical instrument according to claim 8,
wherein the treatment section opening/closing
mechanisms comprise,

5 a first connection pin which supports a proximal
end portion of one of the pair of jaws at the distal
end portion of the sliding member,

a second connection pin which supports the other
jaw to be opened/closed with respect to one jaw, and

10 a regulation member which regulates a movement of
the support.

10. The surgical instrument according to claim 2,
wherein the first driving rod is arranged in
a position of being offset with respect to a center
axis of the insertion section,

15 the sliding member is arranged on a center axis of
the support, and

when the insertion section and the support are
arranged on the same axis, an axial direction of the
connecting rod is inclined in an axial direction of the
20 insertion section and the support.

11. The surgical instrument according to claim 10,
wherein the sliding member has a circular-arc
surface, and

25 a distal end portion of the connecting rod has an
abutment surface which is abutted on the circular-arc
surface of the sliding member.

12. The surgical instrument according to claim 11,

wherein the abutment surface of the connecting rod has inclination in the axial direction of the connecting rod.

13. The surgical instrument according to claim 12,
5 wherein the pair of jaws have treatment section opening/closing mechanisms which are opened oppositely to each other in the axial direction of the support.

14. The surgical instrument according to claim 13,
10 wherein the treatment section opening/closing mechanisms comprise,

a first connection pin which supports a proximal end portion of one of the pair of jaws at the distal end portion of the sliding member,

15 a second connection pin which supports the other jaw to be opened/closed with respect to one jaw, and

a regulation member which regulates a movement of the support.

15. The surgical instrument according to claim 1,
20 wherein the pair of jaws have treatment section opening/closing mechanisms which are opened oppositely to each other in the axial direction of the support.

16. The surgical instrument according to claim 15,
wherein the treatment section opening/closing mechanisms comprise,

25 a first connection pin which supports a proximal end portion of one of the pair of jaws at the distal end portion of the sliding member,

a second connection pin which supports the other jaw to be opened/closed with respect to one jaw, and

a regulation member which regulates a movement of the support.

5 17. The surgical instrument according to claim 3,
 wherein each of the first driving rod, the
connecting rod, the sliding members and the pair of
jaws has conductivity, and

 a connector pin which supplies high-frequency
10 power is electrically connected to at least one of the
first driving rod, the connecting rod, the sliding
member and the pair of jaws.

 18. The surgical instrument according to claim 17,
 the first driving rod is insulated on a side after
15 a position to which the connector pin is connected.

 19. The surgical instrument according to claim 17,
 wherein the connector pin is disposed in the
operation section.

 20. The surgical instrument according to claim 17,
20 wherein the insertion section has a sheath to
cover outer sides of the first and second driving rods,
and an outer peripheral surface of the sheath is
covered with an insulating material.

 21. The surgical instrument according to claim 20,
25 wherein the sheath has a distal end portion, and
the distal end portion of the sheath has an area in
which at least a part of the distal end portion of the

sheath is extended in the axis of the insertion section to the pair of jaws side more than other parts.

22. The surgical instrument according to claim 21,
wherein the area is disposed on a side opposite
5 a rotational direction of the pair of jaws.

23. The surgical instrument according to claim 1,
wherein the operation section has an operation
section main body which comprises a distal end portion
and a proximal end portion, through which the first and
10 second driving rods are inserted, the distal end
portion of the operation section main body being
connected to the proximal end portion of the insertion
section,

a rotary handle which has a distal end portion and
15 a proximal end portion, the distal end portion of the
rotary handle being rotated in one plane with respect
to the proximal end portion of the operation section
main body, and

an opening/closing handle supported to be
20 opened/closed with respect to the rotary handle.

24. The surgical instrument according to claim 23,
wherein the distal end portion of the rotary
handle is pivotally supported on the proximal end
portion of the second driving rod so that when the
25 rotary handle is rotated in one plane in an axis of the
operation section main body, the second driving rod
moves back and forth in the axial direction of the

second driving rod.

25. The surgical instrument according to claim 24,
wherein the rotary handle has a first operation
section connecting rod which has a distal end portion
5 and a proximal end portion, the proximal end portion of
the first operation section connecting rod being
supported by the opening/closing handle so that the
first operation section connecting rod moves back and
forth associatively with opening/closing of the
10 opening/closing handle with respect to the rotary
handle by a pivotal support which pivotally supports
the opening/closing handle, and

a second operation section connecting rod which
has one end portion and the other end portion, one end
15 portion of the second operation section connecting rod
being connected to the distal end portion of the first
operation section connecting rod, and the other end
portion being connected to the proximal end portion of
the first driving rod.

20 26. The surgical instrument according to claim 25,
wherein the rotary handle comprises a first grip
which holds a finger other than a thumb, and

the opening/closing handle comprises a second grip
which is pivotally supported by a pivotal support
25 disposed not in a position where the thumb is arranged
but on the proximal end portion of the rotary handle,
and which holds the thumb not on the pivotal support

but on the distal end portion side of the rotary handle.

27. The surgical instrument according to claim 23,
wherein each of the first driving rod, the
5 connecting rod, the sliding members and the pair of
jaws has conductivity, and

a connector pin which supplies high-frequency
power is electrically connected to at least one of the
first driving rod, the connecting rod, the sliding
10 member and the pair of jaws.

28. The surgical instrument according to claim 27,
the first driving rod is insulated on a side after
a position to which the connector pin is connected.

29. The surgical instrument according to claim 27,
15 wherein the connector pin is disposed in the
operation section.

30. The surgical instrument according to claim 27,
wherein the insertion section has a sheath to
cover outer sides of the first and second driving rods,
20 and an outer peripheral surface of the sheath is
covered with an insulating material.

31. The surgical instrument according to claim 30,
wherein the sheath has a distal end portion, and
the distal end portion of the sheath has an area in
25 which at least a part of the distal end portion of the
sheath is extended in the axis of the insertion section
to the pair of jaws side more than other parts.

32. The surgical instrument according to claim 31,
wherein the area is disposed on a side opposite
a rotational direction of the pair of jaws.

33. A surgical instrument comprising:

5 first and second driving rods which are disposed side
by side and each of which has distal and proximal end
portions;

an operation section disposed in the proximal
end portions of the first and the second driving
10 rods, opened/closed and rotated to transmit
an opening/closing force to the first driving rod,
and a rotating force to the second driving rod; and

a treatment section disposed in the distal end
portions of the first and second driving rods, the
15 treatment section comprising,

a pair of jaws to be relatively
opened/closed,

a support which supports at least one of the
pair of jaws, and pivotally supports the distal end
20 portion of the second driving rod to move in one plane
in an axis of the second driving rod,

a sliding member which is supported by at
least one of the pair of jaws, and slid in an axial
direction of the support to relatively open/close the
25 pair of jaws, and

connection means having rigidity which
connects the distal end portion of the first driving

rod to the sliding member to hold a rotational state
and an opened/closed state of the pair of jaws.

34. The surgical instrument according to claim 33,
wherein the distal end portion of the first
5 driving rod comprises a circular-arc surface, and
the connection means comprises a rod member which
has a distal end portion connected to the sliding
member and a proximal end portion connected to the
distal end portion of the first driving rod, the
10 proximal end portion of the rod member having an
abutment surface which is abutted on the distal end
portion of the first driving rod having the circular-
arc surface to regulate a rotational direction of the
support.

15 35. The surgical instrument according to claim 34,
wherein the abutment surface of the rod member is
inclined in an axial direction of the rod member.

36. The surgical instrument according to claim 33,
wherein the sliding member comprises a circular-
20 arc surface, and
the connection means comprises a rod member which
has a distal end portion connected to the sliding
member and a proximal end portion connected to the
distal end portion of the first driving rod, the distal
25 end portion of the rod member having an abutment
surface which is abutted on the circular-arc surface of
the sliding member to regulate a rotational direction

of the support.

37. The surgical instrument according to claim 36,
wherein the abutment surface of the rod member is
inclined in an axial direction of the rod member.

5 38. A surgical instrument comprising:

first and second driving rods which are disposed
side by side and each of which has distal and proximal
end portions;

an operation section which is disposed in the
10 proximal end portions of the first and the second
driving rods, which comprises distal and proximal end
portions, and which has an operation section main body
through which the first and second driving rods are
inserted, a distal end portion of the operation section
15 main body being connected to the proximal end portion
of the insertion section, a rotary handle having distal
and proximal end portions, a distal end portions of the
rotary handle being rotated in one plane with respect
to the proximal end portion of the operation section
20 main body, and an opening/closing handle supported to
be opened/closed with respect to the rotary handle; and

a treatment section disposed in the distal end
portions of the first and second driving rods, the
treatment section comprising,

25 a pair of jaws to be relatively
opened/closed,

a support which supports at least one of

the pair of jaws, and pivotally supports the distal end portion of the second driving rod to move in one plane in an axis of the second driving rod,

5 a sliding member which is supported by at least one of the pair of jaws, and slid in an axial direction of the support to relatively open/close the pair of jaws, and

10 a connecting rod which has distal and proximal end portions, the sliding member being pivotally supported on the distal end portion of the connecting rod, and the distal end portion of the first driving rod being pivotally supported on the proximal end portion of the connecting rod.